

## WHAT IS CLAIMED IS:

1. A method of immunizing a mammal less than 96 months of age against at least one infectious disease and at least one chronic immune-mediated disorder, comprising

5 administering to said mammal one or more pharmaceutically acceptable pharmaceutical preparations, comprising one or more immunogens, according to an immunization schedule according to which, at specific times after birth, the mammal receives one or more pharmaceutically acceptable doses of one or more immunogens;

10 said mammal thereby receiving, for each said infectious disease, a suitable immunogen in such amounts, given at such ages, as to be effective to substantially prevent or substantially reduce the severity of such infectious disease;

15 said administering further resulting in an immune response in said mamal sufficient to substantially reduce the incidence or severity of at least one chronic immune-mediated disorder in such mammals;

20 the first dose of said immunization schedule beginning before 42 days after birth, and said one or more immunogens acting to substantially reduce said chronic immune mediated disorder include at least one immunogen other than BCG.

2. The method of claim 1 where said mammal is not immunized with an immunogen in such amounts and at such times as would substantially induce said immune-mediated disorder.

25 3. The method of claim 1 where, when all of the immunogens administered are selected from the group consisting of BCG, diphtheria, tetanus, pertussis, polio, hepatitis B, hemophilus influenza, measles, mumps and rubella immunogens, for at least one such immunogen, either

(a) a plurality of doses of the immunogen are administered, and such doses are administered less than 28 days apart, or

(b) the immunogen is a live polio virus and at least five doses are given during the first 112 days after birth, or

5 (c) the immunogen is not a live polio virus, and at least four doses are given during the first 112 days after birth.

4. The method claim 1 wherein at least one immunogen other than a diphtheria, tetanus, pertussis, polio, hepatitis B, hemophilus influenza, measles, mumps and rubella immunogen is  
10 administered.

5. The method of claim 4 wherein one immunogen other than a BCG, diphtheria, tetanus, pertussis, polio, hepatitis B, hemophilus influenza, measles, mumps and rubella, influenza, cholera, BCG, plague, pneumococcus, neisseria, varicella, rabies,  
15 typhoid and yellow fever immunogen is administered.

6. The method of claim 1, wherein for at least one such immunogen, the total dosage during the first 112 days after birth is substantially greater than that required for immunization against the infectious disease with which it is associated.

20 7. The method of claim 1 wherein said at least one immunogen other than BCG is one other than a small pox immunogen.

8. The method of claim 1 wherein the first dose is administered before 28 days after birth.

25 9. The method of claim wherein said immunogens are non-living.

10. The method of claim 1 in which the immunogens are administered parenterally.

11. The method of claim 1 in which the reduction in

incidence of the disorder is at least 10%.

12. The method of claim 1 in which the reduction in incidence of the disorder is at least about 50%.

13. The method of claim 1 in which the reduction in  
5 incidence of the disorder is at least about 20%.

14. The method of claim 1 in which said mammal is of a population in which the normal incidence of the disorder is at least 5.8 per 100,000 individuals of 0-14 years of age, said incidence being standardized for age and sex.

10 15. A method according to claim 1, wherein said chronic immune mediated disorder is selected from the group consisting of an autoimmune disease, asthma/allergy, and an immune mediated cancer.

16. A method according to claim 1, wherein said chronic  
15 immune mediated disorder is diabetes mellitus.

17. A method according to claim 1, wherein said mammal is a human.

18. A method according to claim 1, wherein at least one of said immunogens is an immunogen selected from the group  
20 consisting of an anthrax immunogen, a small pox immunogen, a pneumococcal immunogen, a cholera immunogen, a varicella immunogen, a typhoid immunogen, a yellow fever immunogen, a neisseria immunogen, a plague immunogen, an influenza immunogen, a herpes immunogen, a meningitis immunogen, an adenovirus  
25 immunogen, a malaria immunogen, an HIV immunogen, a cytomegalovirus immunogen, a hepatitis C immunogen, rabies and a molecule that cross reacts to any of said immunogens.

19. An immunogenic agent comprising a plague or anthrax immunogen and at least one other immunogen corresponding to a

different organism or disease selected from the group consisting of a diphtheria immunogen, a tetanus immunogen, a pertussis immunogen, a hemophilus influenza immunogen, a hepatitis B immunogen, a polio immunogen, a measles immunogen, a mumps immunogen, a rubella immunogen, a varicella immunogen, a pneumococcal immunogen, a neisseria immunogen, a influenza immunogen, a cholera immunogen, a typhoid immunogen, a small pox immunogen, a anthrax immunogen, a plague immunogen, a herpes immunogen, a meningitis immunogen, an adenovirus immunogen, a malaria immunogen, an HIV immunogen, a cytomegalovirus immunogen, a hepatitis C immunogen, a rabies immunogen and a molecule that cross reacts immunologically to at least one of said immunogens.

20. A kit comprising a first receptacle holding plague or anthrax immunogen and a second receptacle holding at least one other immunogen corresponding to a different organism or disease selected from the group consisting of diphtheria immunogen, a tetanus immunogen, a pertussis immunogen, a hemophilus influenza immunogen, a hepatitis B immunogen, a polio immunogen, a measles immunogen, a mumps immunogen, a rubella immunogen, a varicella immunogen, a pneumococcal immunogen, a neisseria immunogen, a influenza immunogen, a cholera immunogen, a typhoid immunogen, a small pox immunogen, a anthrax immunogen, a plague immunogen, a herpes immunogen, a meningitis immunogen, an adenovirus immunogen, a malaria immunogen, an HIV immunogen, a cytomegalovirus immunogen, a hepatitis C immunogen, a rabies immunogen, and a molecule that cross reacts immunologically to at least one of said immunogens.

21. In a method for pediatric immunization against at least three infectious diseases, comprising administering at least one

pharmaceutically acceptable dose of diphtheria/ tetanus/pertussis vaccine to a mammal of at least 42 days of age, the improvement comprising

(a) further administering to said mammal at least one pharmaceutically acceptable dose of diphtheria/pertussis/ tetanus vaccine, wherein said further administration (a) is according to at least one step selected from the group consisting of

(1) administering at least two doses of said diphtheria/tetanus/pertussis vaccine at less than 42 days of age of said mammal;

(2) administering said at least one of said dose of said diphtheria/tetanus/pertussis vaccine at less than 42 days of age of said mammal and also administering at least a second dose of said diphtheria/tetanus/pertussis vaccine, said second dose or any subsequent dose administered less than 28 days after the preceding dose when said mammal is less than 175 days of age; and

(3) administering said at least one dose of said diphtheria/tetanus/pertussis vaccine at less than 42 days of age of said mammal and also administering as a total of at least four doses of said diphtheria/tetanus/pertussis vaccine prior to the age of 112 days of said mammal,

wherein the further administration reduces at least one measure selected from the group consisting of incidence, prevalence, frequency, and severity of at least one chronic immune mediated disorder, or at least one surrogate marker of said disorder, in a population and or subpopulation of said mammals.

22. The method of claim 21 wherein said further

administration

(a) comprises further administering to said mammal of at least 28 days of age but less than 175 days of age, at least one pharmaceutically acceptable dose of at least one pharmaceutically acceptable immunogen,

wherein said at least one dose comprises a total of at least 4 separate pharmaceutically acceptable doses of at least one pharmaceutically acceptable immunogen from the group consisting of a diphtheria/tetanus/pertussis immunogen, a hepatitis B immunogen, a hemophilus influenza immunogen, a measles/mumps/rubella immunogen, a polio immunogen, and a non-pediatric immunogen, administered to said mammal during said ages, at least 2 of said at least 4 doses provided prior to the age of 112 days of said mammal, and wherein the further administration reduces at least one measure selected from the group consisting of incidence, prevalence, frequency, and severity of at least one chronic immune mediated disorder, or at least one surrogate marker of said disorder, in a population and or subpopulation of said mammals.

23. In a method for pediatric immunization against at least two infectious diseases, comprising administering at least one pharmaceutically acceptable dose of diphtheria/tetanus/pertussis vaccine and at least one pharmaceutically acceptable dose of hemophilus influenza vaccine to a mammal of at least 42 days of age, the improvement comprising

(a) further administering to said mammal at least one pharmaceutically acceptable dose of at least one of a diphtheria/pertussis/tetanus vaccine and a hemophilus influenza vaccine wherein said further administration (a) is according to

at least one method from the group consisting of

(1) administering at least one dose of both said diphtheria/pertussis/tetanus vaccine and said hemophilus influenza vaccine at less than 42 days of age of said mammal and  
5 at least a second dose of at least one said vaccine prior to 42 days of age of said mammal;

(2) administering at least one of said dose of both said diphtheria/tetanus/pertussis vaccine and said hemophilus influenza vaccine at less than 42 days of age of said mammal and  
10 also administering at least a second dose of both of said vaccines, wherein said second dose and or any subsequent dose is administered at less than 42 days after the preceding dose when said mammal is less than 175 days of age; and

(3) administering at least one of said dose of both  
15 said diphtheria/tetanus/pertussis vaccine and said hemophilus influenza vaccine at less than 42 days of age of said mammal and administering at least four doses, prior to the age of 112 days, of said mammal for said diphtheria/pertussis/ tetanus vaccine or said hemophilus influenza vaccine, wherein the further  
20 administration reduces at least one measure selected from the group consisting of incidence, prevalence, frequency, and severity of at least one chronic immune mediated disorder, or at least one surrogate marker of said disorder, in a population and or subpopulation of said mammals.

25 24. In a method for pediatric immunization against at least two infectious diseases, comprising administering at least one pharmaceutically acceptable first dose of at least one pharmaceutically acceptable immunogen selected from the group consisting of a diphtheria/tetanus/pertussis immunogen, a polio

immunogen, a hepatitis B immunogen, a hemophilus influenza immunogen, a non-pediatric immunogen, and a measles/mumps/rubella immunogen, to a mammal after 112 days of age but prior to 724 days of age, the improvement comprising

5 (a) further administering to said mammal, prior to the age of 112 days, at least one pharmaceutically acceptable second dose containing a greater amount of said immunogen than the amount of immunogen administered as said first dose after 112 days of age but prior to 724 days of age of said mammal, wherein the further  
10 administration reduces at least one measure selected from the group consisting of incidence, prevalence, frequency, and severity of at least one chronic immune mediated disorder, or at least one surrogate marker of said disorder, in a population and or subpopulation of said mammals.

15 25. In a method for pediatric immunization against at least two infectious diseases, comprising administering at least one pharmaceutically acceptable dose of a non-whole cell pertussis vaccine to a mammal at least 42 days of age but prior to 724 days of age, the improvement comprising

20 (a) further administering to said mammal at least one pharmaceutically acceptable dose of at least one pharmaceutically acceptable immunogen selected from the group consisting of an diphtheria/tetanus immunogen, a non-whole cell pertussis immunogen, a whole cell pertussis immunogen, a polio immunogen,  
25 a hemophilus influenza immunogen, a measles/mumps/rubella immunogen and a non-pediatric immunogen, wherein said further administration (a) is according to at least one selected from the group consisting of

(1) administering said at least one dose of said



immunogen at less than 42 days of age of said mammal;

(2) administering said at least one dose of said immunogen, said dose comprising at least a second dose, said second dose or any subsequent said dose administered less than 5 28 days after the preceding dose when said mammal is less than 175 days of age; and

(3) administering at least four doses prior to the age of 112 days of said mammal, wherein the further administration reduces at least one measure selected from the group consisting 10 of incidence, prevalence, frequency, and severity of at least one chronic immune mediated disorder, or at least one surrogate marker of said disorder, in a population and or subpopulation of said mammals.

26. In a method for pediatric immunization against at least 15 two infectious diseases, comprising administering at least one pediatric vaccine to a mammal of at least 42 days of age, the improvement comprising

(a) further administering to said mammal at least one pharmaceutically acceptable dose of at least one pharmaceutically 20 acceptable vaccine selected from (i) a combined vaccine containing at least diphtheria, tetanus, pertussis, and hemophilus influenza immunogens, and (ii) a combined vaccine containing at least diphtheria, tetanus, pertussis, and hepatitis B immunogens,

25 wherein said further administration (a) is according to at least one step selected from the group consisting of

(1) administering at least of one of said dose of said combined vaccine at less than 42 days of age of said mammal;

(2) administering at least one of said dose of said

combined vaccine, said dose comprising at least a second dose, said second dose or any subsequent dose administered less than 28 days after the preceding dose when said mammal is less than 175 days of age; and

5           (3) administrating at least four doses prior to the age of 112 days of said mammal, wherein the further administration reduces at least one measure selected from the group consisting of incidence, prevalence, frequency, and severity of at least one chronic immune mediated  
10 disorder, or at least one surrogate marker of said disorder, in a population and or subpopulation of said mammals.

27. In a method of for pediatric immunization against at least two infectious diseases and tolerizing against at least one antigen, comprising administering at least one pharmaceutically  
15 acceptable dose of at least one pediatric vaccine to a mammal of at least 42 days of age and administering at least one tolerogen to said mammal, the improvement comprising

(a) further administering to said mammal at least one  
20 pharmaceutically acceptable dose of at least one pharmaceutically acceptable immunogen selected from the group consisting of an diphtheria/tetanus/pertussis immunogen, a hemophilus influenza immunogen, a measles/mumps/rubella immunogen, a polio immunogen, and a non-pediatric immunogen,  
25 wherein said further administration (a) is according to at least one step selected from the group consisting of

(1) administrating said at least one dose of said immunogen at less than 42 day of age of said mammal;

(2) administering said at least one dose of said

immunogen, said dose comprising at least a second dose, said second dose or any subsequent dose administered less than 28 days after the preceding dose when said mammal is less than 175 days of age; and

5                   (3) administering at least four doses prior to the age of 112 days of said mammal, wherein the further administration reduces at least one measure selected from the group consisting of incidence, prevalence, frequency, and severity of at least one chronic immune mediated  
10 disorder, or at least one surrogate marker of said disorder, in a population and or subpopulation of said mammals.

28. In a method for pediatric immunization against at least two infectious diseases, comprising administering at least one pharmaceutically acceptable dose of at least one pediatric  
15 vaccine to a mammal of at least 42 days of age, the improvement comprising

(a) further administering to said mammal at least one pharmaceutically acceptable supraimmunogenic dose of at least one pharmaceutically acceptable vaccine prior to the age of 112 days  
20 of said mammal, wherein the further administration reduces at least one measure selected from the group consisting of incidence, prevalence, frequency, and severity of at least one chronic immune mediated disorder, or at least one surrogate marker of said disorder, in  
25 a population and or subpopulation of said mammals.

29. A method according to claim 28, wherein said at least one supraimmunogenic dose comprises at least a second dose, said second dose or any subsequent supraimmunogenic dose is administered less than 28 days after the preceding dose when said

mammal is less than 175 days of age.

30. In a method for pediatric immunization against at least two infectious diseases, comprising administering at least one pharmaceutically acceptable dose of at least one pediatric vaccine to a mammal of at least 42 days of age, the improvement comprising

(a) further administering to said mammal at least one pharmaceutically acceptable dose of at least one pharmaceutically acceptable immunogen to said mammal prior to the age of 8 days; and

(b) further administering at least one pharmaceutically acceptable dose of at least one pharmaceutically acceptable immunogen to said mammal at least 11 days of age but less than 26 days of age,

wherein the further administrations reduce at least one measure selected from the group consisting of incidence, prevalence, frequency, and severity of at least one chronic immune mediated disorder, or at least one surrogate marker of said disorder, in a population and or subpopulation of said mammals.

31. A method according to claim 30, further comprising additionally administering at least one pharmaceutically acceptable dose of at least one pharmaceutically acceptable immunogen at least 11 days, but less than 26 days, after the last dose of said immunogen proceeding 26 days of age of said mammal.

32. A method according to claim 31, further comprising administering at least one pharmaceutically acceptable dose of at least one pharmaceutically acceptable immunogen at least 11 days, but less than 26 days, after said additional

administration.

33. In a method for pediatric immunization against at least two infectious diseases, comprising administering at least one pharmaceutically acceptable dose of at least one pharmaceutically acceptable immunogen to a mammal, the improvement comprising

(A) further administering at least a second pharmaceutically acceptable dose of at least one pharmaceutically acceptable immunogen, said second dose and or any subsequent dose is administered less than 28 days after the preceding dose, wherein said (i) second or any subsequent dose contains the same or different immunogens or the same or different amounts of said immunogens as any other dose; (ii) each said separate dose is administered during a 0-78 hour period, and (iii) the further administration reduces at least one measure selected from the group consisting of incidence, prevalence, frequency, and severity of at least one chronic immune mediated disorder, or at least one surrogate marker of said disorder, in a population and or subpopulation of said mammals.

34. A method according to claim 33, wherein the total number of said separate doses is at least 4 prior to 112 days of age of said mammal.

35. In a method for pediatric immunization against at least two infectious diseases, comprising administering at least one pharmaceutically acceptable dose of hepatitis B vaccine to a mammal of at least 42 days of age, the improvement comprising

(a) further administering to said mammal at least one pharmaceutically acceptable dose of said hepatitis B vaccine

according to at least one step selected from the group consisting of

(1) administering at least 3 said doses of said vaccine at less than 56 days of age of said mammal;

5 (2) administering said at least one dose of said vaccine, said dose comprising at least a second dose, said second dose or any subsequent dose administered less than 28 days after the preceding dose when said mammal is less than 175 days of age; and

10 (3) administering at least four doses prior to the age of 112 days of said mammal,

wherein the further administration reduces at least one measure selected from the group consisting of incidence, prevalence, frequency, and severity of at least one chronic immune mediated disorder, or of at least one surrogate marker of said disorder, 15 in a population and or subpopulation of said mammals.

36. A method of screening at least one potentially pharmaceutically acceptable dose of at least two potentially pharmaceutically acceptable immunogenic agents which comprise at 20 least one potentially pharmaceutically acceptable first pediatric immunogen and at least one agent selected from the group consisting of a second pediatric immunogen and a non-pediatric immunogen, for the ability to modulate the development of at least one chronic immune mediated disorder, or at least one 25 surrogate marker of said chronic immune mediated disorder, in a population and or subpopulation of said mammals, said method comprising

(a) administering, to at least one treatment group of at least one mammal at risk for at least one said chronic immune

mediated disorder, at least one treatment dose of said immunogenic agents according to a treatment administration schedule, said at least one treatment dose comprising at least a first treatment dose of at least one of said immunogenic agents  
5 administered prior to an age of 56 days of said mammal;

(b) optionally defining one or more control groups of at least one said mammal, wherein said control group receives at least one control dose which contains at least one potentially pharmaceutically acceptable pediatric immunogen and has at least  
10 one modification selected from the group consisting of:

(i) lacking at least one immunogenic agent/adjuvant than as is provided in said treatment schedule;

(ii) including at least one immunogenic agent/adjuvant than as is provided in said treatment schedule;

15 (iii) including a higher dose of at least one immunogenic agent/adjuvant than as is provided in said treatment schedule;

(iv) including a lower dose of at least one immunogenic agent/adjuvant than as is provided in said treatment schedule;

20 (v) including at least one additional dose of at least one immunogenic agent/adjuvant than as is provided in said treatment schedule;

(vi) lacking at least one dose of at least one immunogenic agent/adjuvant than as is provided in said treatment  
25 schedule;

(vii) including at least one dose of at least one immunogenic agent/adjuvant at a later time than said immunogenic agent/adjuvant is administered in said treatment schedule;

(viii) including at least one dose of at least one

immunogenic agent/adjuvant at an earlier time than said immunogenic agent/adjuvant is administered in said treatment schedule; and

(ix) no modifications from said treatment schedule wherein at least one measure selected from the group consisting of incidence, prevalence, frequency, and severity of at least one chronic immune mediated disorder, or at least one surrogate marker of said disorder, is potentially or actually determined in said control group;

(c) determining the modulation of development of said at least one chronic immune mediated disorder by at least one of said treatment administration schedule, wherein said determining step (c) comprises ascertaining at least one measure selected from the group consisting of incidence, prevalence, frequency and severity of at least one chronic immune mediated disorder, or at least one surrogate marker of said disorder, in at least one mammal in said at least one treatment group and, optionally, said measures in at least one mammal in said one or more control groups.

37. A method of immunizing a mammal less than 96 months of age against at least two infectious disease and at least one chronic immune-mediated disorder, comprising

administering to said mammal one or more pharmaceutically acceptable pharmaceutical preparations, comprising one or more immunogens, according to an immunization schedule according to which, at specific times after birth, the mammal receives one or more pharmaceutically acceptable doses of one or more immunogens;

said mammal thereby receiving, for each said infectious disease, a suitable immunogen in such amounts, given at such



ages, as to be effective to substantially prevent or substantially reduce the severity of such infectious disease;

5       said administering further resulting in an immune response in said mammal sufficient to substantially reduce the incidence or severity of at least one chronic immune-mediated disorder in such mammal;

      the first dose of said immunization schedule including an immune modulator beginning before 42 days after birth,

10       where said mammal is not immunized with an immunogen in such amounts and at such times as would substantially induce said immune-mediated disorder.